

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:

a mainframe;

a plurality of developing units, each corresponding to  
5 a plurality of colors and each including a developing agent  
container that contains a developing agent and a developing  
agent carrier that carries the developing agent; and

a plurality of image carrying units disposed  
correspondingly to the plurality of developing units and each  
10 including an image carrier that carries a developing agent image  
formed by an electrostatic latent image being developed by the  
developing agent carried on the developing agent carrier;

wherein each of the developing units is attachable to  
and detachable from the corresponding image carrying unit; and

15 the developing units are loadable in and unloadable from  
the mainframe in a state where the developing units are  
integrally attached to the image carrying units.

2. The image forming apparatus of claim 1, wherein each of

20 the developing units is attachable to and detachable from  
the corresponding image carrying unit loaded in the mainframe.

3. The image forming apparatus of claim 1, further  
comprising: a first opening/closing member that is openable

25 and closeable with respect to the mainframe;

wherein the mainframe includes an opening that is opened and closed with the first opening/closing member;

the developing agent image carried on the image carrier is transferred at a transfer position;

5 the first opening/closing member is disposed at the opposite side of the transfer position of the image carrier; and

the developing units and the image carrying units are loaded in and unloaded from the mainframe through the opening.

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4. The image forming apparatus of claim 1, wherein each of the image carrying units has an engagement portion; and

each of the developing units has an engaged portion  
15 engageable with the engagement portion.

5. The image forming apparatus of claim 1, wherein at least one of the developing units includes a grip portion used for gripping the developing unit.

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6. The image forming apparatus of claim 4, wherein at least one of the developing units includes an operational portion configured to be operated to release the engagement between the engagement portion and the engaged  
25 portion.

7. The image forming apparatus of claim 1,  
wherein each of the image carrying units includes a first  
guide portion that guides the corresponding developing unit  
so that the developing agent carrier faces the image carrier;  
5 and

the corresponding developing unit includes a guided  
portion that is guided by the first guide portion.

10 8. The image forming apparatus of claim 7,  
wherein the mainframe includes a second guide portion  
that guides the loading and unloading of the developing units.

9. The image forming apparatus of claim 8,  
15 wherein the second guide portion guides the guided portion  
of each of the developing units so that the guided portion is  
guided to a guide starting position of the first guide portion  
of the corresponding image carrying unit loaded in the mainframe.

20 10. The image forming apparatus of claim 8,  
wherein the mainframe includes a third guide portion that  
guides the loading and unloading of each of the image carrying  
units.

25 11. The image forming apparatus of claim 1, further

comprising:

a plurality of exposure units that are disposed in correspondence to the image carriers to form the electrostatic latent images.

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12. The image forming apparatus of claim 11,  
wherein the developing units and the exposure units are arranged alternately.

10 13. The image forming apparatus of claim 12,  
wherein the developing units and the exposure units are arranged in a substantially vertical direction.

14. The image forming apparatus of claim 12, further  
15 comprising:

a recording medium accommodating unit that accommodates a recording medium to which the developing agent image is transferred, the recording medium accommodating unit being loadable in and unloadable from the mainframe;

20 an operation panel used for operating the image forming apparatus; and

the recording medium discharging unit that discharges the recording medium;

wherein a direction in which the recording medium  
25 accommodating unit is removed, a display direction of the

operation panel, a direction in which the recording medium is discharged from the recording medium discharging unit, and a direction in which the developing units and the image carrying units are unloaded are substantially the same direction.

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15. The image forming apparatus of claims 11,  
wherein each of the exposure units includes a casing having a casing surface; and

the second guide portion and the third guide portion are  
10 disposed so as to be substantially parallel to the casing surface.

16. The image forming apparatus of claim 11,  
wherein each of the exposure units includes a casing having  
15 a casing surface; and

the casing surface doubles as a guide member of each of the image carrying units.

17. The image forming apparatus of claim 10,  
20 wherein the second guide portion and the third guide portion face each of the developing units, at both axial-direction sides of the developing agent carrier.

18. The image forming apparatus of claim 17,  
25 wherein the developing agent container includes a

plurality of developing agent conveyance members that are arranged at predetermined intervals in the loading and unloading direction of each of the developing units; and

each of the developing units includes engagement members  
5 that engage with the second guide portion in the vicinity of a position corresponding to the developing agent carrier and in the vicinity of a position corresponding to the developing agent conveyance member that is farthest from the developing agent carrier.

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19. The image forming apparatus of claim 5,  
wherein a space is disposed above the grip portion in a state where the at least one of the developing units is loaded in the mainframe.

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20. The image forming apparatus of claim 1,  
wherein each of the developing units and the corresponding image carrying unit thereof are integrally attachable with each other while being unloaded from the mainframe; and

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each of the developing units and the corresponding image carrying unit include abutment portions that abut against a placement surface.

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21. The image forming apparatus of claim 20,  
wherein each of the developing units and the corresponding

image carrying unit are independently placeable by the abutment portions.

22. The image forming apparatus of claim 20,

5 wherein each of the image carrying units includes a cover portion that covers at least a part of the corresponding developing unit; and

the cover portion includes one of the abutment portions.

10 23. The image forming apparatus of claim 1,

wherein developing agent remaining on the image carrier is recovered by the developing agent carrier after the developing agent image carried on the image carrier has been transferred to a transfer medium.

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24. The image forming apparatus of claim 1,

wherein each of the image carrying units includes:

a shutter member movable between a cover position where the shutter member covers a transfer position to which the  
20 carried developing agent image is to be transferred and an exposure position where the shutter member exposes the transfer position; and

an urging unit that urges the shutter member to the cover position.

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25. The image forming apparatus of claim 24, further comprising:

a transfer unit that transfers, at the transfer position, the developing agent image carried on the image carrier to the transfer medium;

a second opening/closing member that is provided at the mainframe so as to be openable and closeable and that supports the transfer unit; and

the shutter moving unit that moves the shutter member to the exposure position when the second opening/closing member is closed and that moves the shutter member to the cover position when the second opening/closing member is open.

26. An image forming apparatus, comprising:

a mainframe;

an image carrier that carries a developing agent image formed by an electrostatic latent image being developed by a developing agent and that is loadable in and unloadable from the mainframe;

a transfer unit that transfers the developing agent image carried on the image carrier to a transfer medium at a transfer position;

a shutter member movable between a cover position where the shutter member covers the transfer position facing the



transfer unit in the image carrier and an exposure position where the shutter member exposes the transfer position;

a second opening/closing member that supports the transfer unit, the second opening/closing member provided at  
5 the mainframe so as to be openable and closeable; and

a shutter moving unit that moves the shutter member to the exposure position when the second opening/closing member is closed and moves the shutter member to the cover position when the second opening/closing member is open.

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27. The image forming apparatus of claim 26,

wherein the mainframe includes an opening and a first opening/closing member disposed at the opposite side of the transfer position with respect to the image carrier, so as to  
15 open and close the opening;

the image carrier is loadable in and unloadable from the mainframe through the opening; and,

when the image carrier is loaded through the opening in a state where the second opening/closing member is closed, the  
20 shutter moving unit moves the shutter member to the exposure position.

28. The image forming apparatus of claim 26,

wherein the shutter moving unit includes an urging unit  
25 that urges the shutter member to the cover position.

29. The image forming apparatus of claim 26, further comprising:

an engagement portion that moves in association with the  
5 opening and closing operation of the second opening/closing member;

wherein the shutter member is provided with an engaged member that is engageable with the engagement portion.

10 30. The image forming apparatus of claim 26,

wherein the image carrier includes a plurality of image carriers each corresponding to a plurality of colors.